IN THE CLAIMS:

1. (Currently amended) A method of displaying a representation of a physiological signal produced by an organ of interest of the patient, the method comprising the acts of:

obtaining a portion of at least one physiological signal ~~acquired~~, the obtaining act including acquiring the at least one physiological signal from the exterior of the patient;

determining an area to display;

constructing a virtual image including (M) polygonal areas;

transforming the obtained signal to a plurality of values;

assigning each value to one of the (M) polygonal areas;

assigning a visual characteristic to each polygonal area based in part on the assigned values; and

displaying at least a portion of the virtual image including the assigned visual characteristics.

2. (Currently amended) A method as set forth in claim 1 wherein the act of obtaining a portion of at least one physiological signal includes the acts of placing ~~at least one electrode~~ a plurality of electrodes on the exterior of the patient and obtaining at least a portion of a multi-lead electrical signal acquired from the ~~electrode~~ plurality of electrodes.

3. (Currently amended) A method as set forth in claim 1 wherein the act of obtaining ~~one physiological signal~~ a portion of at least one physiological signal includes the act of obtaining at least a portion of a multi-lead electrocardiogram (ECG) acquired from the patient's exterior.

4. (Original) A method as set forth in claim 3 wherein the multi-lead ECG is a twelve lead ECG.

5. (Currently amended) A method as set forth in claim 4 wherein the obtained portion of the representative signal ~~is one~~ includes one data point for each lead.

6. (Currently amended) A method as set forth in claim 4 wherein the obtained portion of the ~~representative signal is~~ multi-lead ECG includes a plurality of data points representing a portion of the cardiac cycle.

7. (Currently amended) A method as set forth in claim 6 wherein the obtained portion of the ~~representative signal is~~ multi-lead ECG includes the ST-wave of the cardiac cycle.

8. (Currently amended) A method as set forth in claim 1 wherein the act of obtaining at least a portion of the ~~representative~~ at least one physiological signal includes the acts of attaching a sensor to the exterior of the patient and sensing the physiological signal with the sensor to obtain the ~~representative~~ at least one physiological signal.

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9. (Original) A method as set forth in claim 8 wherein the sensor includes a plurality of electrodes.

10. (Currently amended) A method ~~as set forth in claim 1 wherein the act of obtaining at least a portion of the representative signal includes~~ of displaying a representation of a physiological signal produced by an organ of interest of the patient, the method comprising the acts of:

obtaining a portion of at least one physiological signal acquired from the exterior of the patient, including the act of reading the ~~representative~~ at least one physiological signal from a memory device;

determining an area to display;

constructing a virtual image including (M) polygonal areas;

transforming the obtained signal to a plurality of values;

assigning each value to one of the (M) polygonal areas;

assigning a visual characteristic to each polygonal area based in part on the assigned values; and

displaying at least a portion of the virtual image including the assigned visual characteristics.

11. (Original) A method as set forth in claim 1 wherein the virtual image represents at least a portion of the body surface of the patient.

12. (Original) A method as set forth in claim 1 wherein each polygonal area has a size and a shape, and wherein the sizes and shapes are equivalent areas.

13. (Original) A method as set forth in claim 1 wherein each polygonal area is a four-sided polygon.

14. (Original) A method as set forth in claim 1 wherein the act of constructing a virtual image includes the acts of determining the portion of the patient to be represented, creating a multidimensional image representing the portion of the patient to be represented, determining the value of (M), and dividing the representative surface area into (M) polygonal areas.

15. (Original) A method as set forth in claim 1 wherein the act of assigning a visual characteristic to each polygonal area includes assigning a color to each polygonal area, based at least in part on the corresponding assigned value.

16. (Original) A method as set forth in claim 1 wherein the act of assigning a visual characteristic to each polygonal area includes assigning a character to each polygonal area, based at least in part on the corresponding assigned value.

17. (Original) A method as set forth in claim 5 wherein the act of transforming the obtained signals includes transforming the data points of the twelve leads to (M) values, and wherein the act of assigning each value to one of the (M) polygonal areas result in each polygonal area having one of the (M) values.

18. (Original) A method as set forth in claim 1 wherein (M) is equal to one hundred ninety-two.

19. (Original) A method of displaying a representation of an electrocardiogram (ECG), the method comprising the acts of:
obtaining at least a portion of a multi-lead ECG acquired from the patient's exterior;
determining an area to display;
constructing a virtual image including (M) polygonal areas;
transforming the obtain portion of the multi-lead ECG to (M) values;

assigning each value to one of the (M) polygonal areas, the assigning act resulting in each polygonal area having one of the (M) values;

assigning a visual characteristic to each polygonal area based in part on the assigned values; and displaying at least a portion of the virtual image including the assigned visual characteristics.

20. (Original) A method as set forth in claim 19 wherein the number of obtained leads is twelve leads.

a 21. (Original) A method as set forth in claim 20 wherein (M) is equal to one hundred ninety-two.

22. (Currently amended) A method as set forth in claim 19 wherein the obtained portion of the ECG ~~is one~~ include one data point for each lead.

23. (Currently amended) A method as set forth in claim 19 wherein the obtained portion of the ECG ~~is a~~ includes a plurality of data points for each lead representing a portion of the cardiac cycle.

24. (Original) A method as set forth in claim 19 wherein the act of obtaining at least a portion of a multi-lead ECG includes the acts of attaching a sensor to the patient's exterior, sensing the ECG with the sensor, and creating the multi-lead ECG.

25. (Original) A method as set forth in claim 24 wherein the sensor includes a plurality of electrodes.

26. (Original) A method as set forth in claim 19 wherein the act of obtaining at least a portion of a multi-lead ECG includes the acts of reading at least a portion of the multi-lead ECG from a memory device.

27. (Original) A method as set forth in claim 19 wherein the virtual image is a three-dimensional surface area representing at least a portion of the patient.

28. (Original) A method as set forth in claim 19 wherein the (M) polygonal areas are regions on the three-dimensional surface area, wherein the (M) polygonal areas do not overlap, and wherein each polygonal area includes the same amount of area.

29. (Original) A method as set forth in claim 28 wherein each polygonal area is a four-sided polygon.

30. (Original) A method as set forth in claim 19 wherein the act of constructing a virtual image includes the acts of determining the portion of the patient to be represented, creating a multidimensional surface area representing the portion of the patient, determining the value of (M), and dividing the representative surface area into (M) polygonal areas.

31. (Original) A method as set forth in claim 19 wherein the act of assigning a visual characteristic to each polygonal area includes assigning a color to each polygonal area based at least in part on the corresponding assigned value.

32. (Currently amended) A method of analyzing a physiological signal produced by a patient and ~~generate~~ generating an optimal set of signals for particular diagnosis, the method comprising the acts of:

obtaining (N) voltages from ~~a signal~~ (N) signals, respectively, the (N) signals representing the physiological signal, (N) being greater than one;

converting the (N) voltages to (M) values, where (M) is greater than (N);

optimizing the (M) values to (P) values, where (P) is less than (M).

33. (Original) A method as set forth in claim 32 and further comprising classifying the physiological signal with the (P) optimized values.

34. (Original) A method as set forth in claim 33 wherein the act of classifying the physiological signal includes the act of applying the (P) optimized values to a pattern recognition model for obtaining a classification output.

35. (Original) A method as set forth in claim 33 wherein the act of classifying the physiological signal includes the act of applying the (P) optimized values to a neural network for obtaining a classification output.

36. (Original) A method as set forth in claim 33 wherein the act of classifying the physiological signal includes the act of applying the (P) optimized values to a fuzzy algorithm for obtaining a classification output.

37. (Original) A method as set forth in claim 33 wherein the act of classifying the physiological signal includes the act of applying the (P) optimized values to a Bayesian decision logic for obtaining a classification output.

38. (Currently amended) A method as set forth in claim 32 wherein the ~~signal~~ (N) signals representing the physiological signal ~~is an~~ form a (N) multi-lead electrocardiogram.

39. (Original) A method as set forth in claim 38 wherein (N) is equal to twelve, (M) is equal to one hundred ninety-two, and (P) is equal to twelve.

40. (Currently amended) A method as set forth in claim 32 wherein, prior to the act of optimizing the (M) values to (P) values, the method further comprises:
repeating the act of obtaining (N) voltages (C) times, the repeating act resulting in (C) sets of (N) voltages;
repeating the act of converting the (N) voltages to (M) values for each set of (N) voltages, the repeating act resulting in (C) sets of (M) values; and
condensing the (C) sets of (M) values to one set of (M) values.

41. (Currently amended) A method as set forth in claim 40 wherein the physiological ~~signal is~~ signal includes electrical signals that are generated by the patient's heart in a cardiac cycle, and wherein the (C) sets of (N) voltages are an (N) multi-lead representation of a portion of the cardiac cycle.

42. (Original) A method as set forth in claim 32 wherein the act of obtaining the (N) voltages includes the acts of attaching a sensor to the patient's exterior, sensing the physiological signal with the sensor to obtain (N) analog physiological signals, and sampling each signal to produce the (N) voltages.

43. (Original) A method as set forth in claim 42 wherein the sensor includes a plurality of electrodes.

44. (Original) A method as set forth in claim 32 wherein the act of obtaining (N) voltages includes the act of reading the (N) voltages from a memory device.

45. (Currently amended) A method as set forth in claim 40 wherein the (C) sets of (M) values result in (M) <u>virtual</u> signals having (C) data points, and wherein the act of condensing the (C) sets of (M) values includes the act of integrating the (M) values over the (C) data points.

46. (Original) A method as set forth in claim 32 wherein the act of optimizing the (M) values to (P) values includes the acts of obtaining a database of previously recorded comparison values, computing a covariance matrix, and applying principal component analysis to the covariance matrix.

47. (Added) A method as set forth in claim 32 wherein the act of obtaining (N) voltages includes concurrently obtaining the (N) voltages from (N) signals, respectively.

48. (Added) A method as set forth in claim 40 wherein (N) is equal to twelve, (M) is equal to one hundred ninety-two, and (P) is equal to twelve.

INTERVIEW SUMMARY
For interview dated:
November 24, 2003

Applicants' representative, Sheldon L. Wolfe (Reg. No. 43,996) conducted a telephone interview with Examiner Machuga on November 24, 2003.

The parties first discussed claim 1 and U.S. Patent No. 5,687,737 (Branham). Attorney Wolfe directed Examiner Machuga's attention to Electrode array 200, which is in direct contact with the desired cardiac surface of the heart. Attorney Wolfe proposed amending claim 1 to reflect that the obtaining act includes acquiring the at least one physiological signal from the exterior of the patient. Examiner Machuga agreed that claim 1, including the proposed limitation, appears to overcome the rejection. However, Examiner Machuga stated a new search will be required.

The parties then discussed claim 32 and U.S. Patent No. 5,474,078 (Hutson). Attorney Wolfe informed Examiner Machuga that the Applicants plan on amending the obtaining act to specify "obtaining (N) voltages from (N) signals, respectively, the (N) signals representing the physiological signal." Attorney Wolfe then explained that the claimed invention obtains (N) voltages from (N) signals (for example, N = 12 voltages from 12 leads), converts the (N) voltages to (M) values, where (M) is greater than (N) (for example, M = 192 values), and then optimizes the (M) values to (P) values (for example, P = 12 values). Attorney Wolfe then directed Examiner Machuga's attention to Fig. 6 and related text of Hutson. Attorney Wolfe asserted that Hutson describes operating on three-dimensional ECG input data, compressing the data into its singular values and singular vectors, modifying or eliminating some of the singular vectors, operating on the compressed and enhanced data, expanding the enhanced data, and then displaying the expanded data. Attorney Wolfe asserted the proposed claim is not obvious in view of Hutson. The Examiner agreed with Attorney Wolfe that the proposed claim appears to be not obvious in view of Hutson, but requested that the claim further specify that (N) is greater than one. Examiner Machuga did state, however, a new search will be required.